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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of)
)
APPLEYARD et al.) Art Unit: 1713
)
Serial No. 09/275,771) Examiner: Lu
)
Filed: March 25, 1999)
)
For: RANDOM PROPYLENE COPOLYMERS)

Honorable Commissioner of
Patents and Trademarks
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Prior to examination of the present divisional application of Serial No. 09/275,771, kindly amend the application as follows.

CLEAN VERSION OF AMENDMENTS

IN THE SPECIFICATION

Page 1, at indicated line 5, insert the paragraph:

The present application is a divisional application of Serial No. 09/275,771, filed March 25, 1999.

Page 1, line 1, the title has been amended to read as follows:

RANDOM PROPYLENE COPOLYMERS.

Page 1, after the title, the following heading has been inserted:

--BACKGROUND OF THE INVENTION--.

Page 3, line 1, the following heading has been inserted:

--SUMMARY OF THE INVENTION--.

Page 4, line 40, the following headings and paragraph have been inserted:

--BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a graph of elongational viscosity against time.

Fig. 2 is a graph of elongational viscosity against temperature.

DETAILED DESCRIPTION OF THE INVENTION--.

IN THE CLAIMS

Amend the claims as follows:

1. (amended) A process for producing biaxially stretched polypropylene copolymer films in which random propylene copolymers with other 1-alkenes having up to 10 carbon atoms,

whose content of comonomers is in the range from 0.7 to 1.4% by weight if the only comonomer present in the propylene copolymers is ethylene, or

whose content of comonomers is in the range from 0.7 to 3.0% by weight if at least one C_4-C_{10}-1-alkene is present as comonomer, and

whose cold-xylene-soluble fraction is from 1.0 to 2.5% by weight if ethylene is present as a comonomer in the propylene copolymers, or

whose cold-xylene-soluble fraction is from 0.75 to 2.0% by weight if the only comonomers present are C_4-C_{10}-1-alkenes,

are melt extruded through a die to give a film, the extruded film is cooled to from 100 to 20°C so that it solidifies, the solidified film is stretched in the longitudinal direction at from 80 to 150°C with a stretching ratio of at least 4:1 and in the transverse direction at from 120 to 170°C with a stretching ratio of at least 5:1.

2. (amended) A process as claimed in claim 1 in which said random propylene copolymers comprise exclusively ethylene as comonomer.

3. (amended) A process as claimed in claim 1 in which said random propylene copolymers comprise 1-butene as comonomer.

4. (amended) A process as claimed in claim 1 in which said random propylene copolymers have a Q_5 value greater than or equal to 200, where Q_5 is given by

$$Q_5 = 1000 \times \frac{\mu(T_m)}{\mu(T_m\text{-}5K)}$$

and

$\mu(T_m)$ is the elongational viscosity of the random propylene copolymer at the lowest temperature at which the copolymer is fully molten, and $\mu(T_m\text{-}5K)$ is the elongational viscosity at a temperature which is lower by 5K, and the elongational viscosities are determined 2 seconds after stretching beings at a constant strain rate (Hencky) strain rate) $\dot{\varepsilon}$ of 0.2 s^{-1}.

5. (amended) A process as claimed in claim 1 in which said random propylene copolymers have a PI (Processability Index) of greater than 18, where the PI is determined from the formula

$$PI = \ln(SH + 1)\cdot(\ln Q_3 + \ln Q_5),$$

Q_5 is given by

$$Q_5 = 1000 \times \frac{\mu(T_m)}{\mu(T_m\text{-}5K)}$$

and Q_3 is given by

$$Q_3 = 1000 \times \frac{\mu(T_m)}{\mu(T_m\text{-}3K)},$$

$\mu(T_m)$ is the elongational viscosity at the lowest temperature at which the copolymer is fully molten, $\mu(T_m\text{-}5K)$ is the elongational viscosity at a temperature which is lower by 5K and $\mu(T_m\text{-}3K)$ is the elongational viscosity at a temperature which is lower by 3K, and the elongational viscosities are determined 2 seconds after stretching begins at a constant strain rate (Hencky strain rate) $\dot{\varepsilon}$ of 0.2 s^{-1},

and the factor SH (Strain Hardening) is the ratio of the maximum gradient of the curve of elongational viscosity plotted against time on a double logarithmic scale for temperatures less than T_m-5K to the gradient of the elongational viscosity curve 1 second after stretching begins at a constant Hencky strain rate $\dot{\varepsilon}$ of 0.2 s^{-1} at a temperature of T_m-5K.

6. (amended) A process as claimed in claim 1, in which said random propylene copolymers are produced by polymerization in the gas phase at from 50 to 100°C and at a pressure of 15 to 40 bar in the presence of a Ziegler-Natta catalyst system comprising

a) a titanium-containing solid component comprising at least one halogen-containing magnesium compound and an electron donor,

b) an aluminum compound and

c) at least one other electron-donor compound,

and the ratio of the partial pressures of propylene and of the comonomers is adjusted to from 400:1 to 15:1 and the molar ratio of the aluminum compound b) and the other electron-donor compound c) is adjusted to from 20:1 to 2:1.

Cancel claims 7-10.

REMARKS

The present divisional application is directed to non-elected subject matter of the parent application.

Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees to Deposit Account No. 11-0345. Please credit any excess fees to such deposit account.

Respectfully submitted,

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MG/kas

VERSION WITH MARKINGS TO SHOW CHANGES MADE

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Amend the claims as follows:

1. (amended) A [random copolymer of propylene] process for producing biaxially stretched polypropylene copolymer films in which random propylene copolymers with other 1-alkenes having up to 10 carbon atoms,

whose content of comonomers is in the range from 0.7 to 1.4% by weight if the only comonomer present in the propylene copolymers is ethylene, or

whose content of comonomers is in the range from 0.7 to 3.0% by weight if at least one C_4-C_{10}-1-alkene is present as comonomer, and

whose cold-xylene-soluble fraction is from 1.0 to 2.5% by weight if ethylene is present as a comonomer in the propylene copolymers, or

whose cold-xylene-soluble fraction is from 0.75 to 2.0% by weight if the only comonomers present are C_4-C_{10}-1-alkenes,

are melt extruded through a die to give a film, the extruded film is cooled to from 100 to 20°C so that it solidifies, the solidified film is stretched in the longitudinal direction at from 80 to 150°C with a stretching ratio of at least 4:1 and in the transverse direction at from 120 to 170°C with a stretching ratio of at least 5:1.

2. (amended) A [random propylene copolymer] process as claimed in claim 1 in which said random propylene copolymers comprise [comprises] exclusively ethylene as comonomer.

3. (amended) A [random propylene copolymer] process as claimed in claim 1 in which said random propylene copolymers comprise [comprises] 1-butene as comonomer.

4. (amended) A [random propylene copolymer] process as claimed in claim 1 in which said random propylene copolymers have a [whose] Q_5 value [is] greater than or equal to 200, where Q_5 is given by

$$Q_5 = 1000 \times \frac{\mu(T_m)}{\mu(T_m\text{-}5K)}$$

and

$\mu(T_m)$ is the elongational viscosity of the random propylene copolymer at the lowest temperature at which the copolymer is fully molten, and $\mu(T_m\text{-}5K)$ is the elongational viscosity at a temperature which is lower by 5K, and the elongational viscosities are determined 2 seconds after stretching beings at a constant strain rate (Hencky) strain rate) $\dot{\varepsilon}$ of 0.2 s^{-1}.

5. (amended) A [random propylene copolymer] process as claimed in claim 1 in which said random propylene copolymers have a PI [whose PI] (Processability Index) [is] of greater than 18, where the PI is determined from the formula

$$PI = \ln(SH + 1)\cdot(\ln Q_3 + \ln Q_5),$$

Q_5 is given by

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and Q_3 is given by

$$Q_3 = 1000 \times \frac{\mu(T_m)}{\mu(T_m\text{-}3K)},$$

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5K and $\mu(T_m\text{-}3K)$ is the elongational viscosity at a temperature which is lower by 3K, and the elongational viscosities are determined 2 seconds after stretching begins at a constant strain rate (Hencky strain rate) $\dot{\varepsilon}$ of 0.2 s^{-1},

and the factor SH (Strain Hardening) is the ratio of the maximum gradient of the curve of elongational viscosity plotted against time on a double logarithmic scale for temperatures less than T_m-5K to the gradient of the elongational viscosity curve 1 second after stretching begins at a constant Hencky strain rate $\dot{\varepsilon}$ of 0.2 s^{-1} at a temperature of T_m-5K.

6. (amended) A process [for preparing random propylene copolymers] as claimed in claim 1, in which <u>said random</u> propylene <u>copolymers</u> [are polymerized with other 1-alkenes having up to 10 carbon atoms from] <u>are produced by polymerization in</u> the gas phase at from 50 to 100°C and at a pressure of 15 to 40 bar in the presence of a Ziegler-Natta catalyst system comprising

a) a titanium-containing solid component comprising at least one halogen-containing magnesium compound and an electron donor,

b) an aluminum compound and

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and the ratio of the partial pressures of propylene and of the comonomers is adjusted to from 400:1 to 15:1 and the molar ratio of the aluminum compound b) and the other electron-donor compound c) is adjusted to from 20:1 to 2:1.

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